AGENCY OF NATURAL RESOURCES

DEPARTMENT OF FORESTS, PARKS AND RECREATION

STATE OF VERMONT

FOREST INSECT AND DISEASE CONDITIONS

SOUTHERN REGION

CALENDAR YEAR 1988

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INTRODUCTION

The information in this report is based on aerial surveys to detect defoliation, dieback and mortality; as well as ground surveys and observations of Forest Resource Protection personnel and other forestry staff.

Aerial surveys were flown in early June (6/1-6/6) to detect thrips defoliation and late in the season (8/30-). U. S. Forest Service personnel flew over the Green Mountain National Forest in late June ( ).

Diagnostic assistance was provided by the University of Vermont, Vermont Department of Agriculture, the U. S. Forest Service, Penn State University, and USDA-APHIS.

WEATHER SUMMARY

The winter of 1987-88 was generally mild, with less than average precipitation.

Spring began normally, but cool and/or dry conditions at budbreak delayed leaf development 1-2 weeks. Late spring remained dry, with no precipitation at all for the first three weeks of June. Mid-summer weather was hot with rainfall closer to normal.

Dry weather caused symptoms of stress to be more severe than normal on many species, especially on poor sites, and where trees were suffering from other insect and disease problems.

Delayed leaf development may be responsible, in part, for the severity of pear thrips damage in 1988.

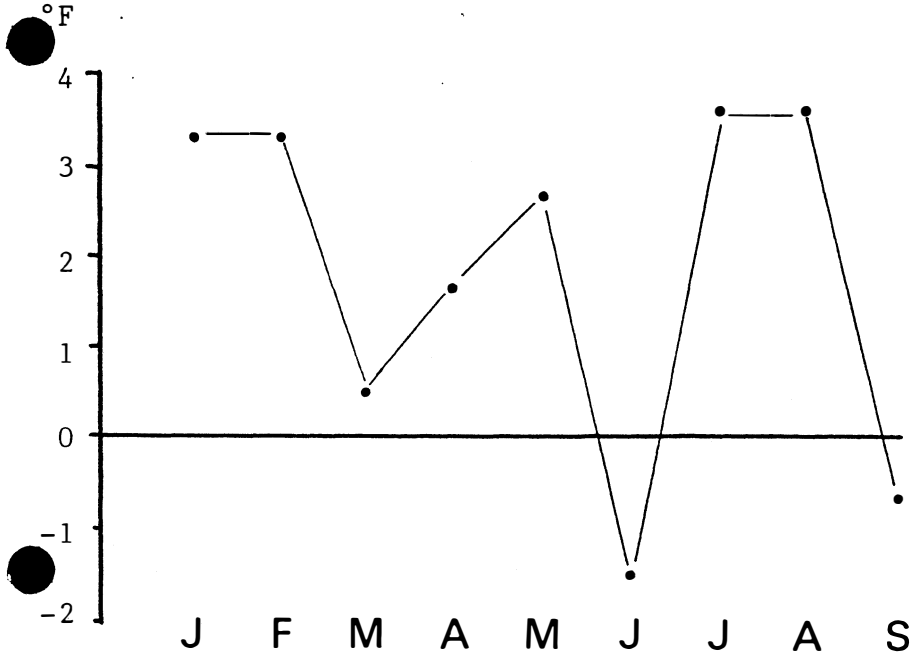
Weather for the season is summarized in Figure 1.

Figure 1: 1988 Weather Summary

Data from NOAA Local Climatological Data: Monthly Summary
Burlington International Airport

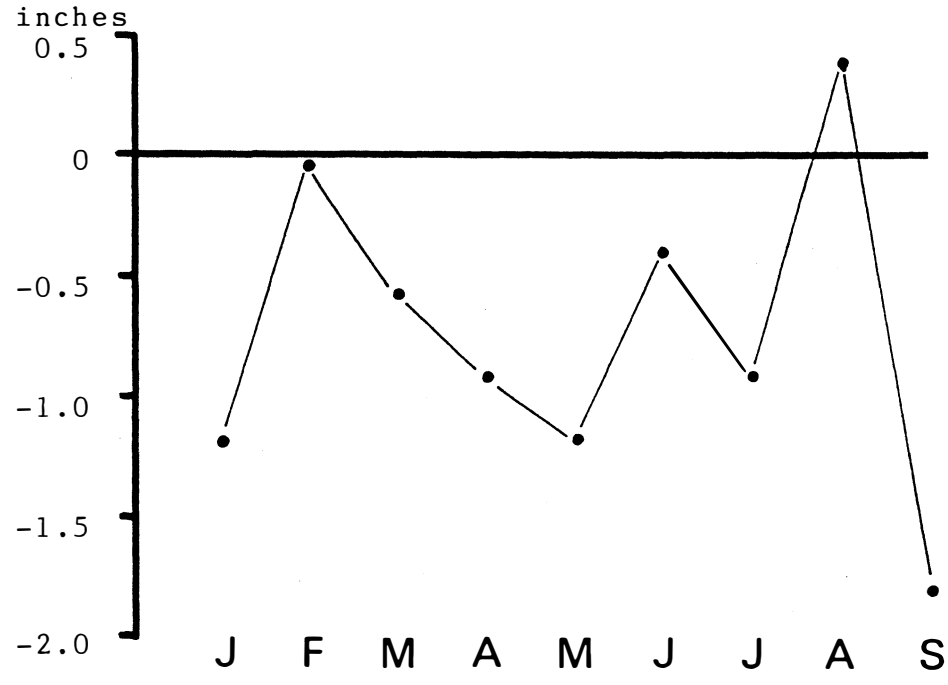
Temperature:

Departure from Normal



Precipitation:

Departure from Normal



FOREST INSECTS

Hardwood Defoliators

Forest Tent Caterpillar, Malacosoma disstria, caused 130 acres of light defoliation in Pownal. Larvae were frequently seen in maple and oak stands throughout the region.

Pheromone traps (five traps per stand) were placed in four locations. Two locations were new in 1988. At one location (Barnard), two different lures were used (two component and three component).

There is considerable variability in trap catches per location, although the regionwide average in 1988 is close to the 1987 average (Table 1).

Table 1. Forest tent caterpillar moth catch in pheromone traps - 1985 to 1988.

	Average Number of Moths per Trap			
Location	1985	1986	1987	1988
Bethel	0.6	0.8	2.0	1.8
Barnard	--	--	13.6	1.8 (1)*
Bridgewater	--	--	--	17.6
Sherburne	--	--	--	15.0
Average	0.6	0.8	7.8	9.0

* Number in parentheses indicates average number of moths caught in a cluster of 2 component lure traps.

Traps were also placed in the Green Mountain National Forest by the U. S. Forest Service. Very few moths were caught, with the average catch per trapping dropping to 0.1, from 6.5 in 1987 and 6.7 in 1986. All moths caught were from traps in southern Vermont (Manchester Ranger District).

Gypsy Moth, Lymantria dispar, populations continued to build, with 1,300 acres of light to moderate defoliation mapped in Rutland County (West Haven (550 A), Fair Haven (350 A), and Benson (400 A)). (Map 1). Light defoliation and caterpillars were observed throughout the region, with lowest populations in southern Bennington and Windham Counties.

Populations continued to increase in most of the focal area monitoring plots (Table 2). In many of the areas, larval and egg mass counts were as high, or higher in the "resistant" areas as in the focal areas.

Table 2. Gypsy moth counts from focal area monitoring plots 1986-1988.

Plot Location	# of Larvae and Pupae[1,4]			# of Moths[2]		# of Egg Masses[3,4]		
	1986	1987	1988	1987	1988[5]	1986	1987	1988
Minards Pond	9	28	104	495	45	0	0	7
Fort Dummer	4	12	9	324		2	0	1
Handley Mountain	6	4	5	273	0	1	1	4
Perch Pond[6]	6	134	241	718	0	0	115	226
Rocky Pond	26	57	317	176	0	0	6	53
Petersburg	8	14	31	359	8	1	0	1
Tate Hill	2	1	47	127	15	0	0	6
Pownal	--	--	32	--	21	--	--	0
Average	9	36	98	353	22	1	17	37

1. Number under burlap bands in 15 m (.045 acre) diameter plots at peak 5th instar.
2. Total count per one trap.
3. Total number in 15 m diameter plots.
4. Average of 2 or 3 plots in 1986 and 2 plots in 1987.
5. 1988 traps are believed to have been defective.
6. Sprayed with Bt in 1988 as part of a cooperative research project.

Apparently the gypsy moth traps were defective, this year. Few moths were caught, although flying moths were abundant throughout the region. Moth catches were also low in traps placed by the U. S. Forest Service on the Green Mountain National Forest.

The Perch Pond site was part of a cooperative study with the University of Vermont and the U. S. Forest Service to suppress gypsy moth outbreaks in foci to prevent out break spread to surrounding areas. _____ acres were sprayed with Bt in the Pond Woods wildlife management area. The Rocky Pond area was a check site for this study.

Additional five-minute walk egg mass surveys were done in Rockingham, Rupert, Sandgate, Pownal, and Petersburg, New York (Table 3). Acres of light or moderate defoliation are predicted for the sites in Rupert and Sandgate.

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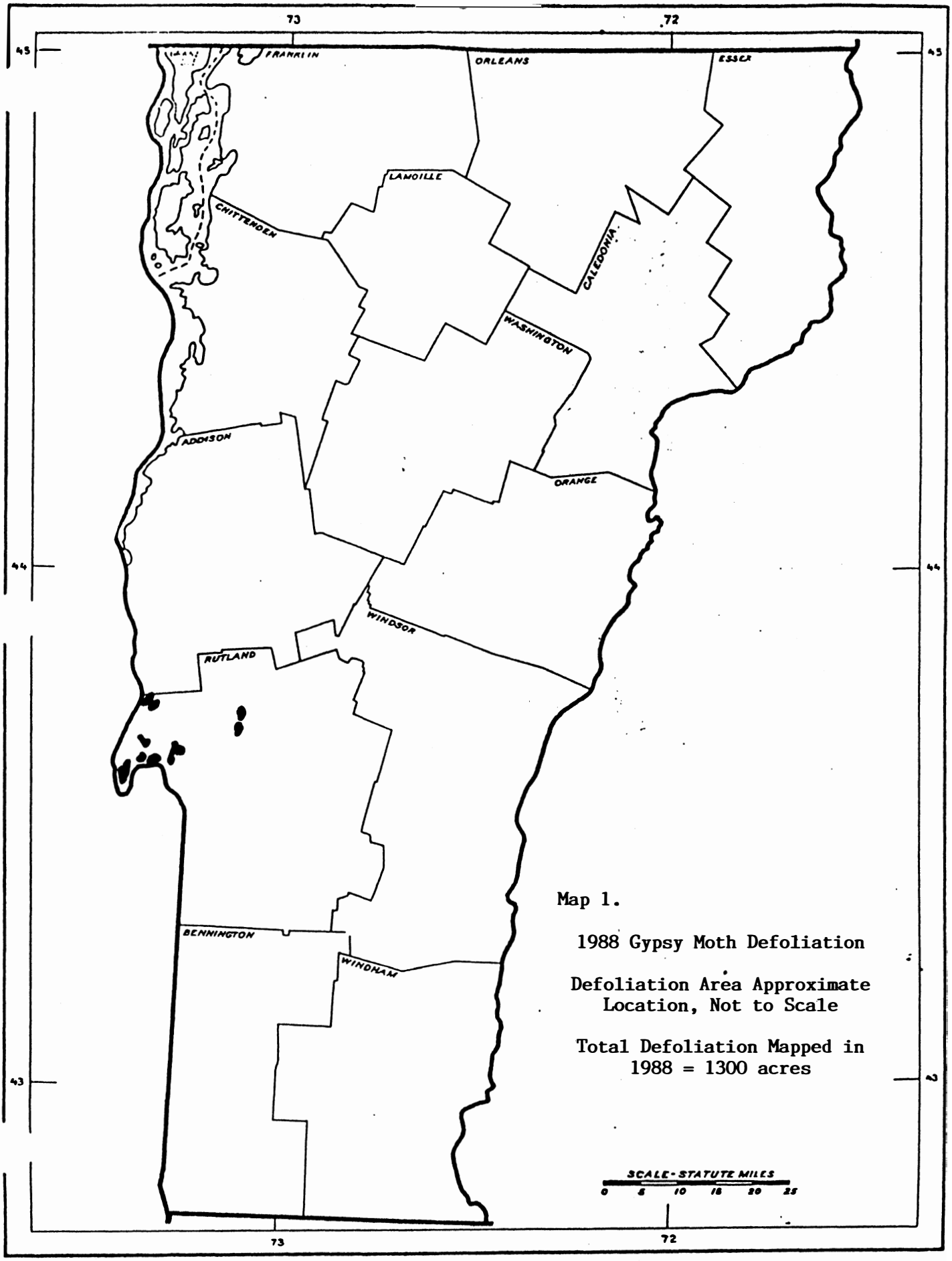

Map 1.

1988 Gypsy Moth Defoliation

Defoliation Area Approximate Location, Not to Scale

Total Defoliation Mapped in 1988 = 1300 acres

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Table 3. 1988 Gypsy moth egg mass 5-minute walk counts.

Location	# of Walks	% Egg Mass New	Avg. # New Egg Masses/5 Minutes	Estimated Egg Masses/Acre
Rupert	2	95%	12	150-250
Sandgate	4	95%	13	175-300
Pownal	2	--	0	<100
Petersburg	2	--	0	<100
Rockingham	22	100%	<1	<100

Except for heavy parasitism in one of the Perch Pond plots, egg masses throughout the region are large and healthy. Scattered egg masses are found in mixed hardwood sites as well as pure oak stands. Light to moderate defoliation is expected in Rutland County and northern Bennington County in 1989, with some pockets of heavier defoliation expected.

Oak Leafroller, Archips semiferanus, was associated with other insects causing early oak defoliation throughout the region. Damage was most severe in southern towns. Other insects associated with defoliation were treehoppers and lecanium scale. The most severe damage often occurred in areas with heavy pear thrips defoliation. Symptomatic trees often had tattered or mishapen leaves with scars on the veins and petioles. This suggests that thrips may also be involved in the damage observed.

Oak Leaf Tier, Croesia semipurpurana, moths were caught in pheromone traps placed in Brattleboro and Rockingham in mid-June (Table 4). Identification was confirmed by the APHIS systematics laboratory in Beltsville. No oak leaf tier caterpillars have been observed.

Table 4. Oak leaf tier moth catch in pheromone traps.

Location	# of Traps[2]	# of Moths/Trap[2]
Brattleboro	3	40
Rockingham	1	60

Saddled Prominent, Heterocampa guttivata, populations are increasing. Caterpillars were observed causing light defoliation throughout the region, although no defoliation was mapped during aerial surveys. Pupal sampling (Table 5) indicates that defoliation will remain light in many areas, although some heavier defoliation is expected. Egg mass surveys by the U. S. Forest Service on the Green Mountain National Forest in late June correctly predicted negligable defoliation.

Table 5. Number of saddled prominent pupae found in fall 1988 samples.

Location	Live Pupae/Ft		Pupal Skins/Ft	
	1987	1988	1987	1988
Shrewsbury - forest	0.3	1.7	0.6	0.6
Shrewsbury - sugarbush	0.3	0.6	0.2	1.1
Granville	--	0.2	--	0.1
Chittenden	--	0.2	--	0.1
Danby	--	0.1	--	0.3

OTHER HARDWOOD DEFOLIATORS

INSECT	HOST(S)	LOCALITY	REMARKS
Birch Leaf Miner Fenusa pusilla	Birch sp.	Throughout	Moderate defoliation to ornamental and forest trees. Less than 1987.
Birch Leaf Folder Ancylis discigerana			Not observed.
Birch Skeletonizer Bucculatrix canadensisella			Not observed.
Bruce Spanworm Operophtera bruceata			Not observed.
Early Birch Leaf Edgeminer Malacosoma americanum	Birch sp.	Throughout	Moderate defoliation. Less than 1987.
Eastern Tent Caterpillar Malacosoma Uamericanum	Cherry Apple	Widespread	Some trees with heavy defoliation, but less than 1987.
Elm Leaf Beatle Pyrrhalta luteola			Not observed.
Elm Leaf Miner Fenusa ulmi	Elm	Brattleboro	Ornamentals.
Fall Cankerworm Alsophila pometaria		Bennington	Egg mass collected.

OTHER HARDWOOD DEFOLIATORS

INSECT	HOST(S)	LOCALITY	REMARKS
Fall Webworm *Hyphantrea cunea*	Hardwoods	Widespread	Scattered defoliation of ornamental and roadside trees. Less than 1987.
Forest Tent Caterpillar *Malacosoma disstria*			See narrative.
Green Striped Mapleworm *Anisota rubicunda*	Maples	Rupert	Individual caterpillar.
Gypsy Moth *Lymantria dispar*			See narrative.
Half Winged Geometer *Phigalia titea*			Not observed.
Large Aspen Tortrix *Choristoneura conflictana*			Not observed.
Linden Looper *Erranis tiliaria*			Not observed.
Locust Leaf Miner *Odontata dorsalis*		Putney N. Bennington County	Very noticeable, but less than 1987.
Maple Leaf Cutter *Paraclemensia acerifoliella*	Sugar Maple	Throughout	Damage to understory foliage and thrips refoliation. Increasing in Londonderry and Grafton.

OTHER HARDWOOD DEFOLIATORS

INSECT	HOST(S)	LOCALITY	REMARKS
Spring Cankerworm Paleacrita vernata			Not observed.
Uglynest Caterpillar Archips cerasivoranus	Cherry	Dorset West Haven	Scattered nests.

OTHER HARDWOOD DEFOLIATORS

INSECT	HOST(S)	LOCALITY	REMARKS
Maple Trumpet Skeletonizer Epinotia aceriella	Sugar Maple	Rutland & Windsor Counties	Increasing, causing light defoliation.
Maple Webworm Tetralopha asperatella			Not observed.
Mountain Ash Sawfly Pristiphora geniculata	Mountain Ash	Pownal Sherburne	Several larvae.
Oak Leafroller Archips semiferanus			See narrative.
Oak Leaf Tier Croesia semipurpurana			See narrative.
Oak Skeletonizer Bucculatrix ainsliella	Oak	S. Bennington County	Light populations. Lower than 1987.
Pin Oak Sawfly Caliroa sp.			Not observed.
Saddled Prominent Heterocampa guttivata			See narrative.
Satin Moth Leucoma salicis			Not observed.
Solitary Leaf Roller Sparganothis pettitana	Sugar Maple		Not observed

Softwood Defoliators

Spruce Budworm, Choristoneura fumiferana, larvae or defoliation were not observed. Three pheromone trap clusters placed at seven locations on the Green Mountain National Forest by the U.S. Forest Service caught only one month (Granville).

OTHER SOFTWOOD DEFOLIATORS

INSECT	HOST(S)	LOCALITY	REMARKS
Arborvitae Leaf Miner Argyresthia thuiella	Arborvitae	Rutland & Windsor Counties	Widespread moderate damage to ornamentals.
Green Hemlock Needleminer Coleotechnites apicitripunctella	Hemlock	Woodstock	Ornamental.
Introduced Pine Sawfly Diprion similis	White Pine	Clarendon	Ornamental.
Larch Casebearer Coleophora laricella			Not observed.
Larch Sawfly Pristophora erichosonii			Not observed.
Red Headed Pine Sawfly Neodiprion lecontei			Not observed.
Spruce Budworm Choristoneura fumiferana			See narrative.

SOFTWOOD DEFOLIATORS

INSECT	HOST(S)	LOCALITY	REMARKS
Spruce Bud Moth *Zeiraphera canadensis*			Not observed.
White Pine Sawfly *Neodiprion pinetum*			Not observed.
Yellow-headed Spruce Sawfly *Pikonema alaskensis*			Not observed.

SAPSUCKING INSECTS, MIDGES, AND MITES

Norway Maple Aphid, Periphyllus lyropictus, was heavy again on sugar maple, often in association with pear thrips.

Aphid counts were made along with pear thrips counts on developing buds in six sugarbushes (see Pear Thrips). Data from two sugarbushes which were also sampled in 1987 suggest that aphid numbers dropped in 1988 (Table 6). In general, there was no correlation between aphid numbers and thrips numbers, or between aphid numbers and subsequent defoliation of nearby trees (Table 7).

Table 6. Average number of Norway maple aphids from plots in 2 sugarbushes: 1987-1988.

Location	Number of Aphids Per Bud[1]					
	Plot					Sugarbush
	1	2	3	4	5	Average
Dummerston						
1987	0.1	1.7	1.2	10.1	0.0	2.6
1988	0.0	0.0	0.1	0.0	0.1	0.0
Sunderland						
1987	13.6	4.9	2.2	0.6	6.7	5.6
1988	1.4	0.4	0.6	1.0	1.7	1.0

1. Average of 20 developing buds from sugar maple regeneration.

Table 7. Average number of Norway maple aphids, pear thrips and percent defoliation in 6 sugarbushes: 1988.

Sugarbush Location	Insect Counts [1] # of Aphids/Bud	# of Thrips/Bud	% Defoliation [2]
Woodstock	1.8	1.1	10
Landgrove	2.0	8.7	70
Smokey House	0.4	15.7	16
Danby	0.5	9.6	56
Sunderland	1.0	12.4	78
Dummerston	0.0	4.9	50

Correlation Coefficients (n=30)

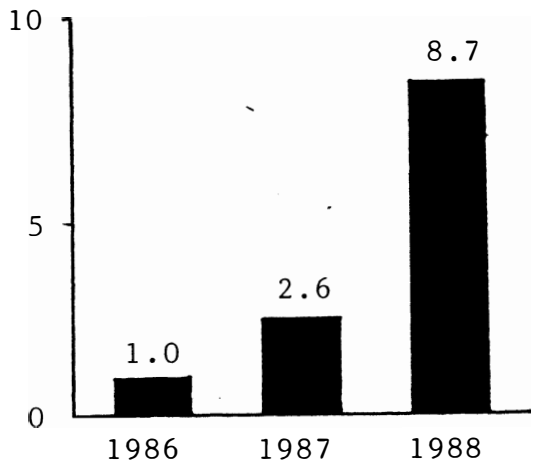
Aphids:	Defoliation	.06 (n.s.)
Aphids:	Thrips	-.08 (n.s.)
Thrips:	Defoliation	.31 (n.s.)

1. Average of 100 buds
2. Average of 5 trees

Pear Thrips, Taeniothrips inconsequens, caused damaged foliage of sugar maples throughout the region, resulting in 429,600 acres of defoliation mapped from the air, compared with only 21,800 acres mapped in 1987. (Table 8, Map 2). The most severe damage was in the southern towns, with little damage in the main range of the Green Mountains. Especially hard hit were the towns of Arlington, Dorset, Manchester, Pownal, Sandgate, Brattleboro, Halifax, Marlboro, Westminster, and Whitingham.

The severe damage was caused, in part, by higher numbers of thrips (as indicated by thrip monitoring plots, Figure 2) and cool spring weather. Swollen buds expanded slowly in early May, giving the thrips a long time to feed on the tiny leaves. Dry weather may have further increased symptom severity.

Figure 2. Average thrips counts[1] in buds for six sugarbushes[2]: 1986-1988.



1. Average of 100 buds

2. For only two sugarbushes in 1986

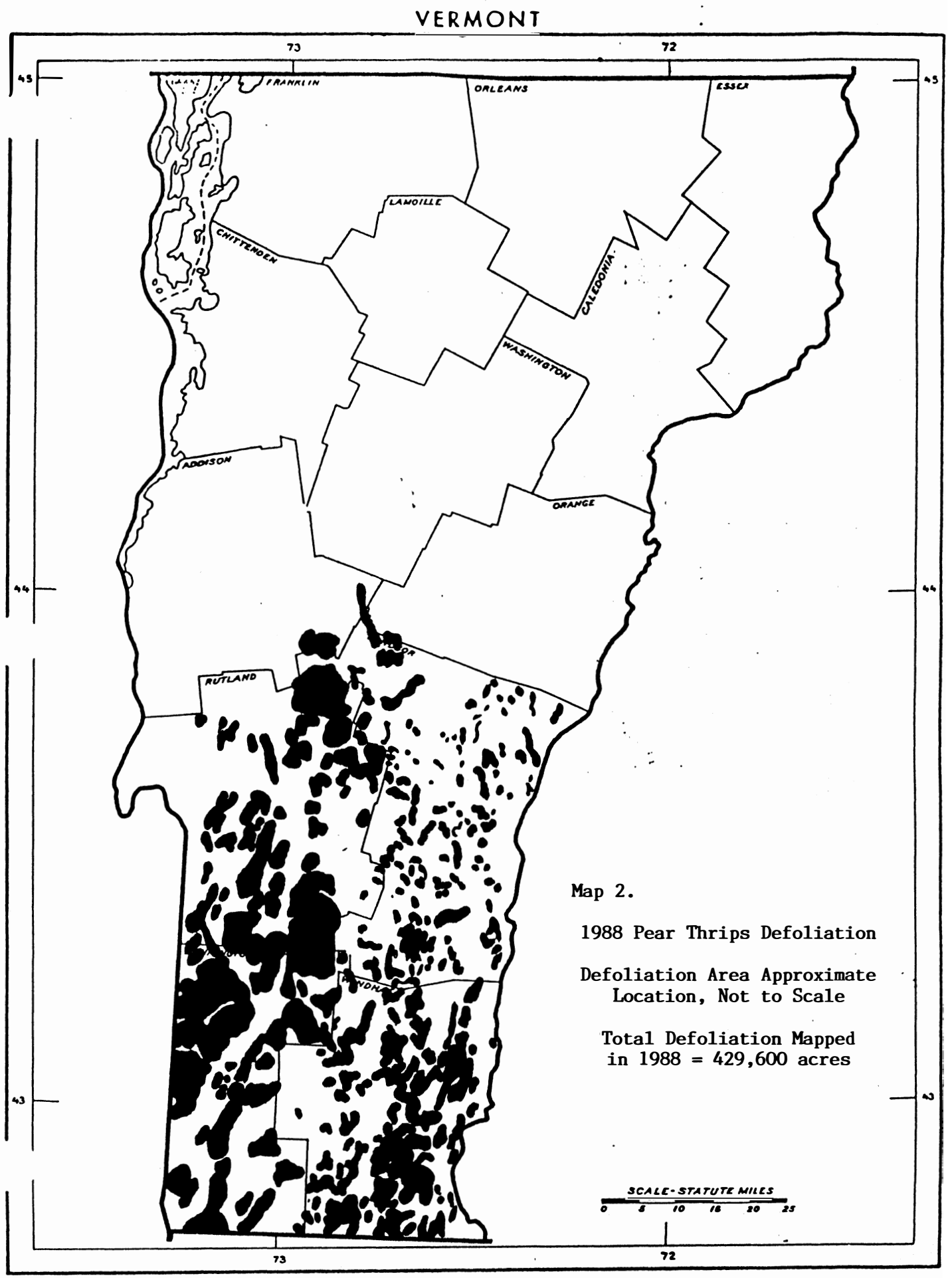


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Table 8. Mapped acres of defoliation by pear thrips.

County	Damage Level				Total Acres
	Moderate	Moderate-High	High	Severe	
Bennington	49,300	12,800	114,000	3,100	179,200
Rutland	77,400	33,900	31,800	0	143,100
Windham				5,000	69,000
Windsor				0	38,300
Total					429,600

1. Moderate = discolored foliage (mapped in Bennington and Rutland Counties only)
   Moderate-High = discoloration with scattered patches of thin crowns
   High = thin crowns with scattered patches of no foliage
   Severe = areas of no foliage large enough to map

Damage in 1988 was not only higher than before in extent, but also in severity. Many trees, including most of those on the 8,100 acres mapped as severely defoliated, did not produce leaves at all. On some, buds were so badly damaged that new shoots and buds did not develop. Within a stand, damage was often most severe on trees which were producing seed. The heaviest defoliation was usually on lower branches.

Severely defoliated trees began refoliating during the first week of June. Many stands completely refoliated, although trees on shallower sites had thin crowns throughout the summer. Partially defoliated trees had refoliation as well, although most also retained their damaged leaves through the season.

Additional data from monitoring plots strengthens the correlation between numbers of insects in buds of regeneration and overstory defoliation (Figures 3 and 4).

One sugarbush studied, however, (Smokey House), continues to have high insect numbers and little defoliation. (Without this sugarbush, r for sugarbushes (n = 10) is .89, and for trees (n = 50) is .76). The height of the crowns may prevent damage to foliage in this location.

An aerial application of Sevin XLR plus was applied to 20 acres of a defoliated sugarbush on May 26 (1 lb. A.I./acre) to test the efficacy on thrips immatures. Results are being analyzed by the University of Vermont. Half of the spray area (10 acres) was subsequently fertilized by air. Fifty pounds of 7-9.4-18.8 with 12% calcium oxide, 8% Mg oxide, 4% calcium nitrate and 2% Mg sulfate was applied.

A low volume application of dye was tested in a sugarbush in Shaftsbury to see if buds could be covered with ground equipment. Some coverage was obtained to the top of 70' tall trees.

Figure 3. Percent defoliation of 6 sugarbushes (average of 5 trees) by number of thrips in developing buds of adjacent understory maples (average of 100 buds) 1986-1988. Correlation coefficient = .56, significant at p = .10. Letters indicate different locations.

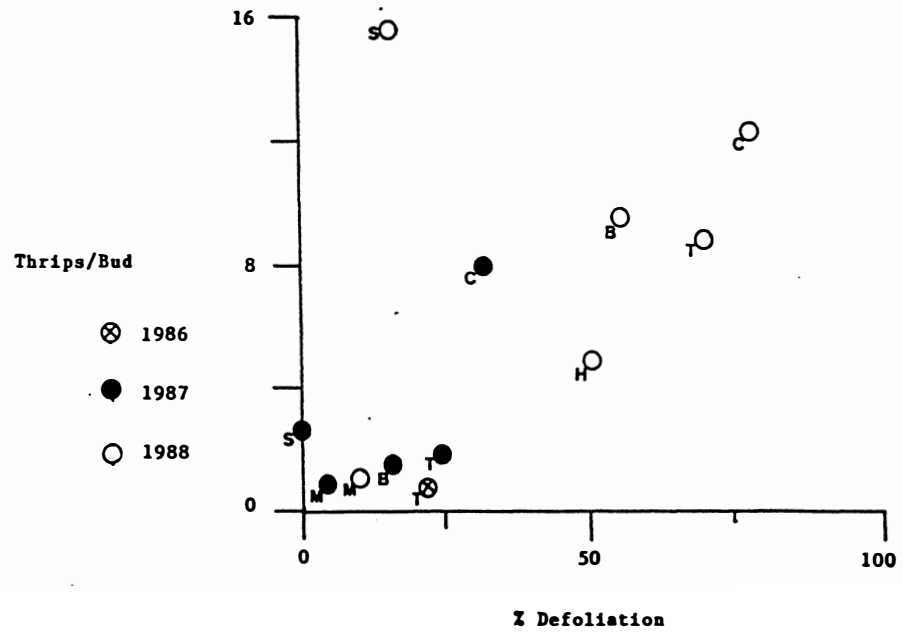
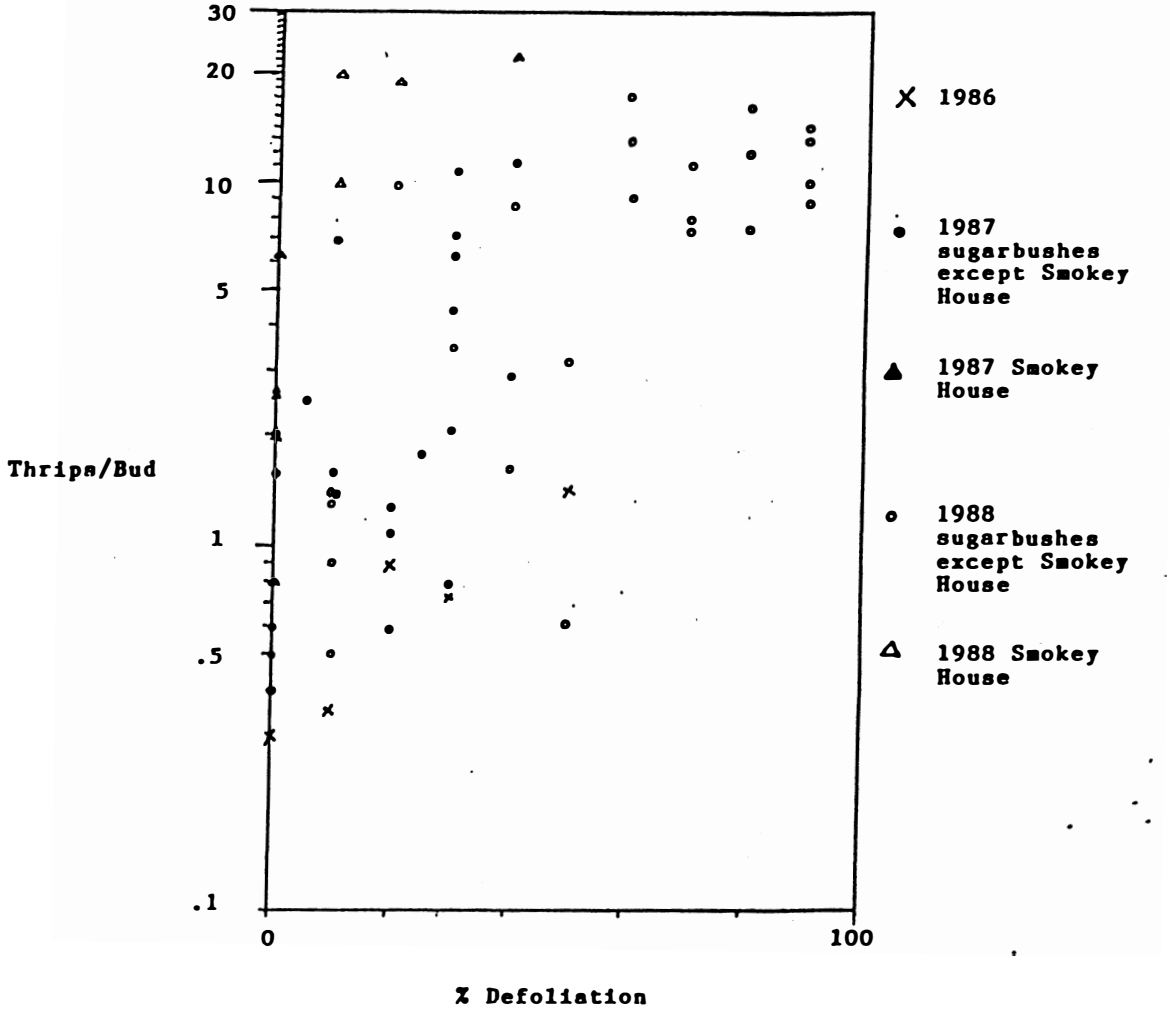


Figure 4. Percent defoliation of 5 plot trees in 6 sugarbushes by number of thrips in developing buds of adjacent understory maples (average of 20 buds) 1986-1988. Correlation coefficient = .53, significant at p = .01.



OTHER SAPSUCKING INSECTS, MIDGES & MITES

INSECT	HOST(S)	LOCALITY	REMARKS
Balsam Gall Midge *Paradiplosis tumifex*			Not observed.
Balsam Twig Aphid *Mindarus abietinus*	Balsam Fir	Rutland County Jamaica	Light damage.
Balsam Woolly Aphid *Adelges piceae*	Balsam Fir	Sherburne Weston	Light damage.
Cooley Spruce Gall Adelgid *Adelges cooleyi*	Douglas Fir	Weathersfield Pownal	Christmas trees.
Eastern Spruce Gall Adelgid *Adelges abietis*	Norway Spruce White Spruce	Bennington Hubbardton	Ornamentals and Christmas trees.
Hemlock Woolly Adelgid *Adelges tsugae*	Hemlock	Absent	No suspects seen.
Lecanium Scale *Lecanium sp.*	Maple Oak Black Locust	Windham & Windsor Counties	Very heavy in some sugarbushes and forest stands. Impact unknown. Heavy sooty mold on understory foliage. Associated often with treehoppers and oak leafroller on oak.
Norway Maple Aphid *Periphyllus lyropictus*			See narrative.
Oystershell Scale *Lepidosaphes ulmi*			Not observed.

OTHER SAPSUCKING INSECTS, MIDGES & MITES

INSECT	HOST(S)	LOCALITY	REMARKS
Pear Thrips *Taeniothrips inconsequens*			See narrative.
Pine Bark Aphid *Pineus strobi*	White Pine	Springfield	Light populations on Christmas trees.
Pine Needle Midge *Contarinea baeri*			Not observed.
Pine Spittlebug *Aphrophora parallela*	Scots Pine	Rutland County	Widespread.
Root Aphid *Prociphilus aericanus*			Not observed.
Spruce Spider Mite *Oligonychus ununguis*	Balsam Fir	Jamaica	Light damage to Christmas trees. Populations lower than 1987.
Treehoppers *Membracidae*	Red Oak	Windham & So. Windsor Counties	Sometimes heavy on defoliated oak. Associated with lecanium scale and oak leafroller.

BUD, SHOOT, & STEM INSECTS

INSECT	HOST(S)	LOCALITY	REMARKS
Allegheny Mound Ant Formica exsectoides	White Spruce	Shrewsbury	Scattered dead Christmas trees.
Ambrosia Beetle Scolytidae	Birch	Widespread	Common at higher elevations.
Balsam Shootboring Sawfly Pleroneura bruneicornis			Not observed.
Bronze Birch Borer Agrilus anxius	White Birch	Quechee Springfield	Stressed ornamentals.
Pine Root Collar Weevil Hylobius radicis	Scots Pine	Rutland	Causing pockets of mortality in Christmas trees.
White Pine Weevil Pissodes strobi	White Spruce White Pine	Brattleboro Brookline Dummerston Springfield Rutland County	Moderate damage to ornamentals and Christmas trees. Symptoms seen throughout region.

ROOT INSECTS

INSECT	HOST(S)	LOCALITY	REMARKS
Wireworms Elateridae	Fir	Weston	Associated with Christmas trees.

FOREST DISEASES

Stem Diseases

Beech Bark Disease, caused by Cryptococcus fagisuga and Nectria coccinea var. faginata was visible throughout, but symptomatic crowns were not as obvious as 1987.

Scale and Nectria returned to pre-1987 levels in monitoring plots (Figure 5) except in Woodford. This reflects an increase in beech scale seen throughout Bennington County.

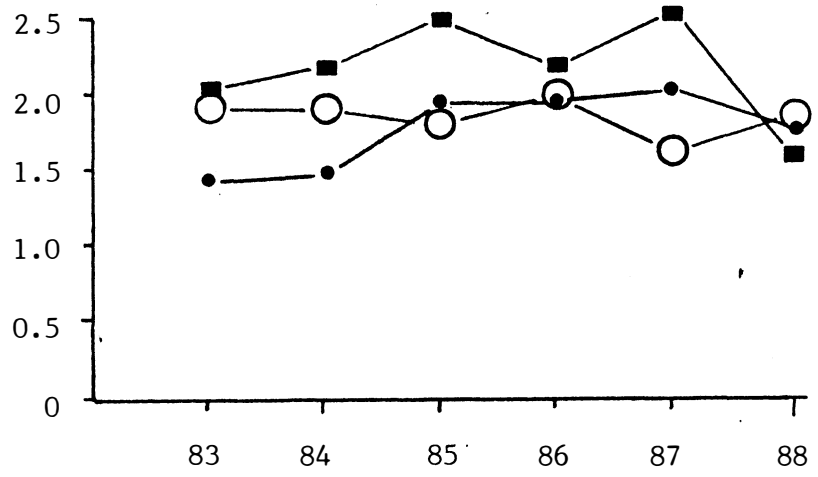
Maple Cankers and branch flagging, caused by Steganosporium sp. or Nectria sp., occurred on sugar maple throughout the region. Affected branches were mostly in the lower crown. Dry weather and defoliation may have reduced bark moisture, making branches particularly vulnerable to canker diseases this year.

Figure 5. Summary of Beech Bark Disease Monitoring Plots 1983-1988.

Plot Location: ● Sherburne ○ Ludlow ■ Woodford

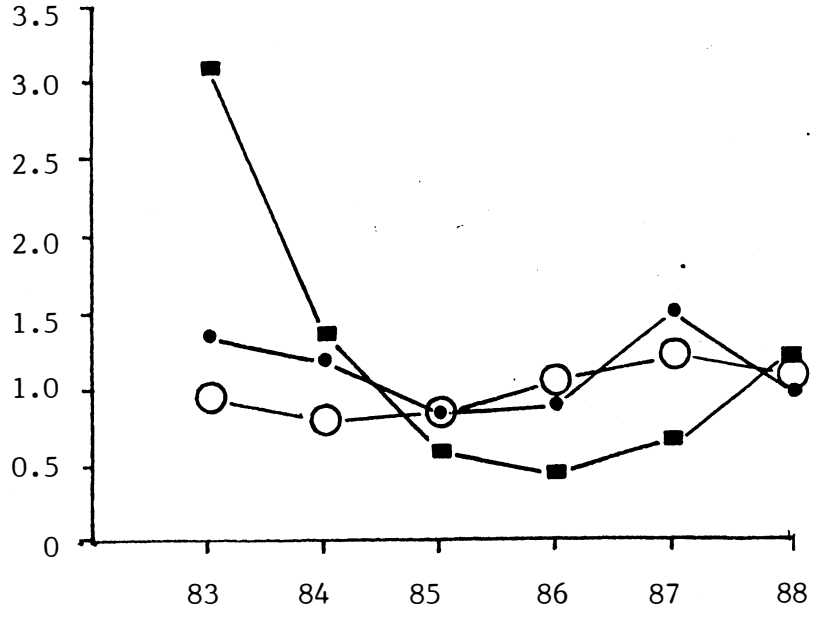
Average Tree Condition

1 Good
2 Fair
3 Poor
4 Dead



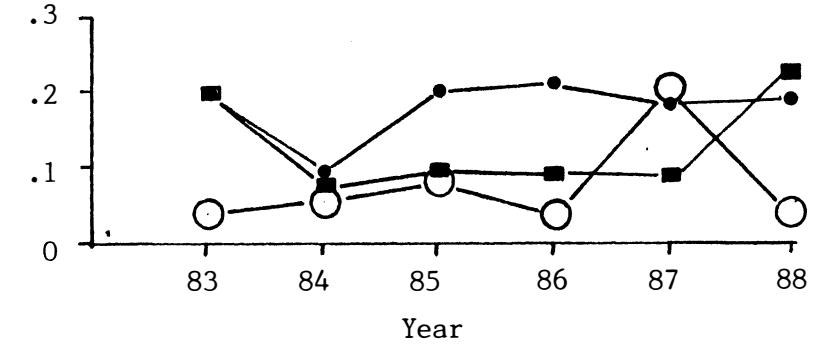
Average Wax Cover

0 No colonies
1 Trace
2 Light
3 Moderate
4 Heavy
5 Very Heavy



Average Nectria Fruiting

0 Absent
1 Sparse
2 Moderate
3 Heavy
4 Very Heavy



OTHER STEM DISEASES

DISEASE	HOST(S)	LOCALITY	REMARKS
Annual Canker *Fusarium* sp.	Sugar Maple	Dover	Open pole-small sawlog stand. Higher elevation.
Balsam Fir Twig Abnormality *Sclerotinia kerneri*	Balsam Fir	Dummerston Weston	Ornamentals.
Beech Bark Disease *Cryptococcus fagisuga* and *Nectria coccinea* var. *faginata*			See narrative.
Black Knot *Dibotryon morbosum*	Cherry	N. Bennington County	Abundant.
Cytospora Canker *Leucostoma kunzei*			Not observed.
Dutch Elm Disease *Ceratocystis ulmi*	Elm	Widespread	No increase noticed in disease severity.
Fireblight *Erwinia amylovora*		Wallingford	Ornamental.
Hypoxylon Canker *Hypoxylon pruinatum*	Aspen	Proctor	
Maple Canker *Steganosporium* sp. *Nectria* sp.			See narrative.

OTHER STEM DISEASES

DISEASE	HOST(S)	LOCALITY	REMARKS
Oak Wilt *Ceratocystis fagacearum*	Oak sp.	Absent	No suspect areas was detected by trained observers during aerial surveys.
Scleroderris Canker *Gremmeniella abietina*	Pines	Absent	No symptomatic trees seen in the region.
Verticillium Wilt *Verticillium albo-atrum*			Not observed.
White Pine Blister Rust *Cronartium ribicola*	White Pine	Pittsford Springfield	Scattered mortality to Christmas trees. Moderate increase elsewhere.
Woodgate Gall Rust *Endocronartium harknessii*			Not observed.

FOLIAGE DISEASES

DISEASE	HOST(S)	LOCALITY	REMARKS
Anthracnose *Gloeosporium* spp.	Sugar Maple		Reported to be associated with early damage to maple leaves.
Cyclaneusma Needlecast *Cyclaneusma minus*	Scots Pine	Springfield	Common on Christmas trees.
European Larch Needlecast *Mycosphaerella laricina*	European Larch	Chester	Ornamental.
Lophodermium Needlecast *Lophodermium pinastri*	Scots Pine	Pittsford Springfield	Christmas trees.
Rhabdocline Needlecast *Rhabdocline pseudotsugae*	Douglas Fir	Weathersfield	Heavy damage to Christmas trees.
Rhizosphaera Needlecast *Rhizosphaera kalkhoffi*	White Spruce	Bennington	
Sooty Mold *Perisporiaceae*	Regeneration	Windham and S. Windsor Counties	Heavy in locations where lecanium scale has been heavy.
Swiss Needlecast *Phaeocryptopus gaumani*	Douglas Fir	Weathersfield	Christmas trees.

ROOT ROTS

DISEASE	HOST(S)	LOCALITY	REMARKS
Annosus Root Rot *Heterobasidion annosum*	Red Pine		No new infection centers reported.
Shoestring Root Rot *Armillaria mellea*	Red Spruce Hardwoods	Throughout	No increase in severity observed.

DIEBACKS, DECLINES & ENVIRONMENTAL DISEASES

ASH DIEBACK and mortality continues to occur throughout the region. No change in disease severity was noted.

BIRCH DECLINE is increasing in the region, particularly at higher elevations. Several successive years of widespread birch defoliation is probably responsible for the increase. Ambrosia beetles are often found in association with declining birch.

DROUGHT CONDITIONS during spring and early summer increased tree stress throughout the regions. The effects of drought were most severe on poor or shallow sites. Symptoms of stress by insects, disease, or other factors were exacerbated by drought conditions. Several yard maple trees in Windsor County, already wounded by lawnmowers, died suddenly. Drought conditions were also responsible for many transplanting failures.

IMPROPER PLANTING was the cause of mortality to a spruce Christmas tree plantation in Brookline and hemlock ornamentals in Putney. Trees were planted too deep.

KILLING WITH KINDNESS finished off some mature Norway spruce ornamentals which were heavily mulched with manure.

MAPLE DECLINE continues to be of concern throughout the region. Trees on poor sites, or suffering from previous mismanagement, were further stressed by drought conditions this year.

Permanent monitoring plots were established in six sugarbushes and six forest stands as part of the North American Maple Project. This regional effort, coordinated by the U. S. and Canadian Forest Services, will evaluate the health of sugar maple throughout its range.

NUTRIENT DEFICIENCY is suspected to be the cause of chlorotic foliage on balsam fir Christmas trees. Only current growth on lower branches is chlorotic on trees with mild symptoms, suggesting that an immobile nutrient is involved. Foliar analysis indicated that chlorotic foliage had much less Manganese than normal needles.

SNOW DAMAGE, from the October 1987 snowstorm, is still obvious in affected areas of Bennington County. Several severe windstorms (>40 M.P.H.) have occurred, which caused additional breakage of weakened branches and stems. Often, adjacent trees are broken, when they are hit by falling debris.

SPECIAL EFFECTS killed a dozen trees on the green in Townshend. Vermont didn't have enough snow to suit its image in Hollywood, so the trees were coated with fire retardant foam. Sugar maple branches that were sprayed in the winter were dessicated by early spring.

WHITE PINE NEEDLE BLIGHT was very mild this year, after several successive years of severe symptoms. Research on the cause of this syndrome at Penn State University and by the U. S. Forest Service is looking at Vermont trees. A new needlecast fungus has been described on affected needles.

ANIMAL DAMAGE

ANIMAL	SPECIES DAMAGED	LOCALITY	REMARKS
Deer	White Pine	Andover	Stripped bark on pole-sized trees in former deeryard. Wounds are now closing.
Mouse			No damage observed.
Porcupine	Hardwoods	Peru	Young trees.
Sapsucker	Mountain Ash	Springfield	Ornamentals stressed by lawnmower injury.
Squirrel	Tubing	Grafton Sharon	Requests referred to APHIS.

CONDITIONS REPORT - O'BRIEN

OZONE - OZONE LEVELS WERE HIGH IN NEW ENGLAND IN THE SUMMER OF 1988. A METER ATOP MOUNT GREYLOCK (MA) ~~REGISTERED~~ INDICATED CONCENTRATIONS IN JUNE, JULY AND AUGUST EXCEEDED 80 ppb FOR A TOTAL OF 194 HOURS AND 120 ppb FOR 5 HOURS. SYMPTOMS OF LIGHT TO MODERATE INJURY TO BLACK CHERRY, WHITE ASH, ~~[illegible]~~ WHITE PINE, AND SEVERAL SHRUBS WAS NOTICIBLE ON BOTH THE WMNF AND THE GMNF, AS WELL AS COASTAL NH.

TREND: EPISODIC, BUT GENERALLY UP.

PEAR THRIPS - DEFOLIATION IN VERMONT INCLUDED ABOUT 31,400 ACRES (1700 HEAVY; 11,500 MODERRTE; 10,500 LIGHT; AND 7200 WITH SCATTERED DAMAGE)

TREND: INCREASE 3X OVER 1987, 1989 UNCERTAIN

GYPSY MOTH - TRAP CATCHES AT ALL 16 FEDERAL SITES DECLINED IN 1988 TO VERY LOW LEVELS. NO ~~DEFOL~~ NOTICIBLE DEFOLIATION ON FEDERAL LAND.

TREND: ~~D~~ECLINING LAST SEVERAL YEARS, NO GEN. INCREASE APPARENT FOR 1989.

SPRUCE BUDWORM - TRAP CATCHES AT 6 FEDERAL SITES INDICATE VERY LOW POPULATIONS

TREND: STABLE

HEMLOCK LOOPER - MANY MOTHS CAUGHT IN

BUDWORM TRAPS SUGGEST POPULATION INCREASING IN ME.

FOREST TENT CATERPILLAR – TRAP CATCHES ON GMNF INDICATE A LOW, STABLE POPULATION.

SADDLED PROMINENT – EGG SURVEY ON GMNF INDICATE LOW, STABLE POPULATION.

1988
~~1987~~ PEST CONDITIONS REPORT WORK SHEET

PEST - (COMMON NAME):

(SPECIFIC NAME):

HOST:

PRESENT CONDITION:

AREA - TOTAL ACRES:

LOCATION:

SEVERITY - INCLUDE ACRES OF MODERATE AND HEAVY DEFOLIATION OR INFECTION; DEFINE CLASSES:

LOSSES - INCLUDE AREAS OF TREE MORTALITY; ALSO VOLUME AND/OR $ ESTIMATES:

TREND - CHANGES IN INCIDENCE AND SEVERITY OVER THE PAST FEW YEARS AND EXPECTATIONS FOR NEXT YEAR:

CONTROL PROJECTS - METHOD, MATERIAL, ACRES, COST, RESULTS:

ADDITIONAL COMMENTS:

1988 PEST CONDITIONS REPORT WORK SHEET

PEST - (COMMON NAME): Pear Thrips

(SPECIFIC NAME): Taeniothrips inconsequens

HOST: Sugar Maples & Northern Hardwoods

PRESENT CONDITION:

AREA - TOTAL ACRES: 31000

LOCATION: Green Mountain NF within Purchase Boundaries

SEVERITY - INCLUDE ACRES OF MODERATE AND HEAVY DEFOLIATION OR INFECTION; DEFINE CLASSES:
See Comments
Ofsite Report Detection Survey July 1988

LOSSES - INCLUDE AREAS OF TREE MORTALITY; ALSO VOLUME AND/OR $ ESTIMATES:

TREND - CHANGES IN INCIDENCE AND SEVERITY OVER THE PAST FEW YEARS AND EXPECTATIONS FOR NEXT YEAR:
Expect Next year - plan to survey again in 1989

CONTROL PROJECTS - METHOD, MATERIAL, ACRES, COST, RESULTS:
None in S&PF
State with. Sugar plantation owners

ADDITIONAL COMMENTS: Planning ~~Survey~~ - Control

Thrips damage visible from the air is estimated at 31,420 acres on Federal lands of the Green Mountain National Forest in 1988; this is an increase from 9,600 acres in 1987. In the southern portion, Manchester RD, within National Forest boundaries 26,300 acres were defoliated: 1600 acres heavy; 10,000 acres moderate; 8000 acres light; and scattered damaged trees within northern hardwood stands equal to about 6700 acres. (See Figure 1.) On the northern portion of the Forest that includes the Middlebury and Rochester RD, a total of 5120 acres were defoliated: 120 acres heavy; 1500 acres moderate; 2500 acres light; and 1000 acres scattered damaged. (See Figures 2.) In addition to the thrips defoliation dieback was observed within the older stands on the forest. These stands had been reported in previous years.

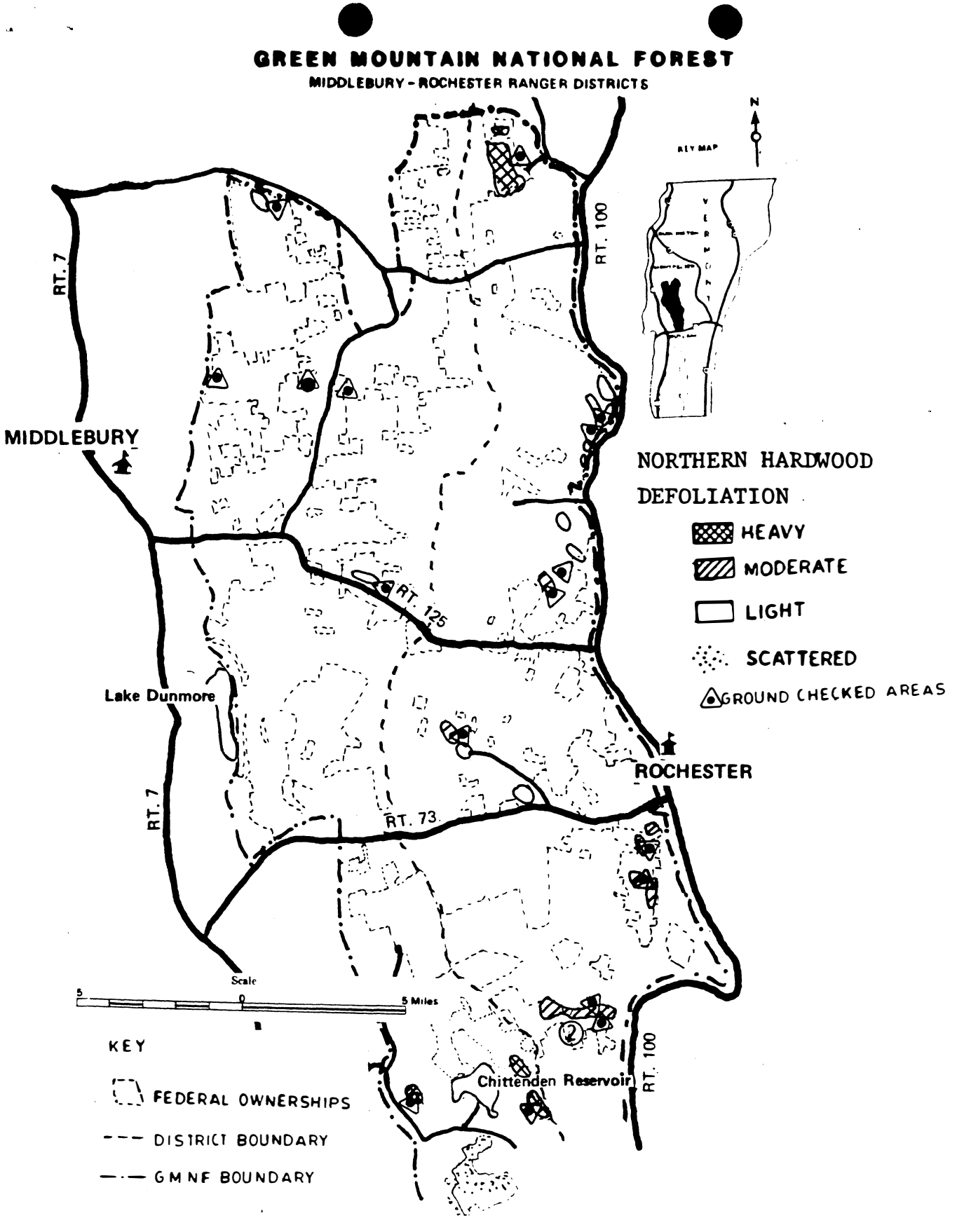


Figure 2. Location of defoliated northern hardwood areas on the Middlebury and Rochester Ranger Districts.

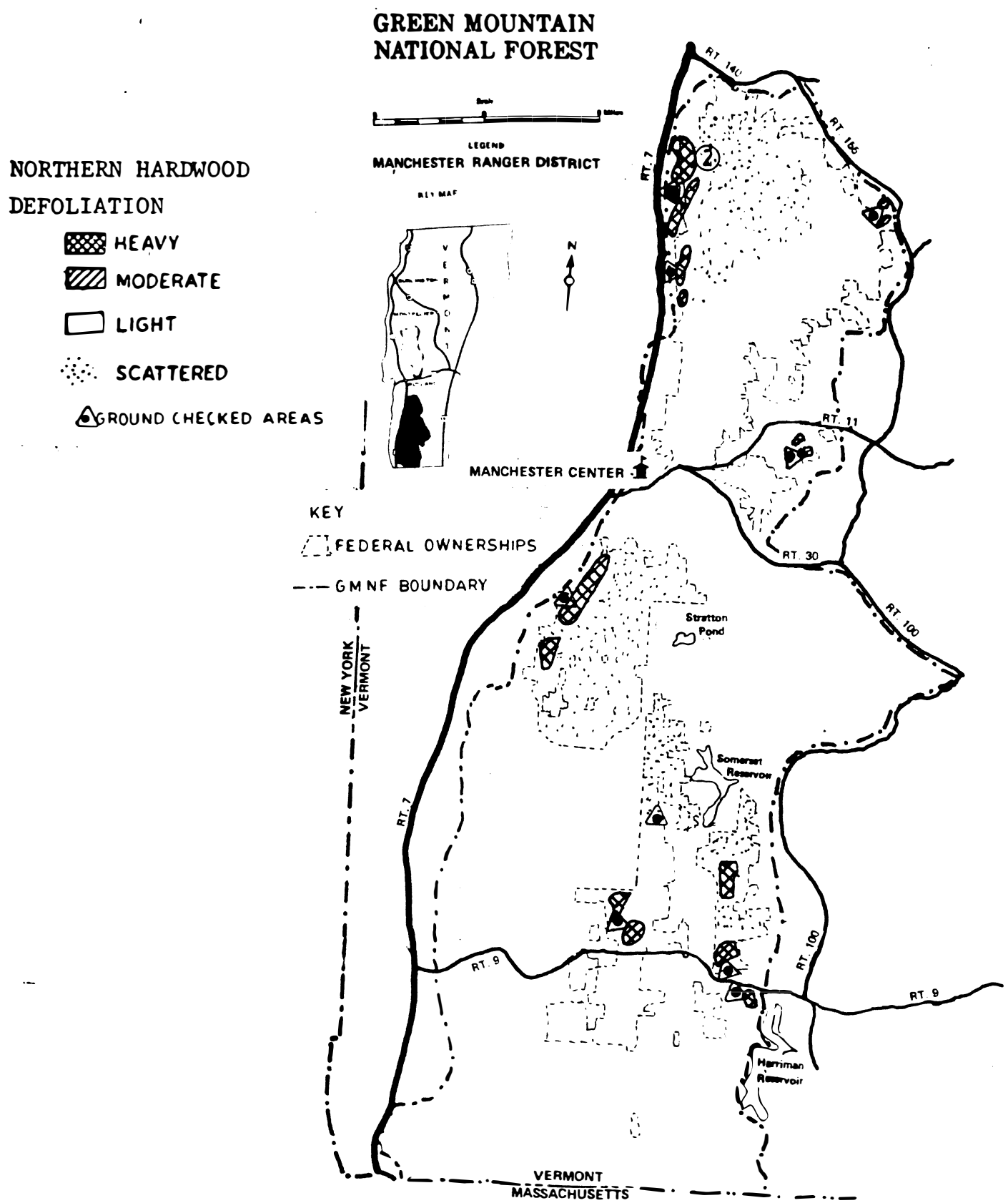


Figure 1. Location of defoliated northern hardwood areas on Manchester Ranger District.